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# Image watermarking-a spread spectrum application

Tirkel, A.Z. Osborne, C.F. Van Schyndel, R.G.

Scientific Technol., Armadale, Australia;

This paper appears in: Spread Spectrum Techniques and Applications Pr 1996., IEEE 4th International Symposium on

Meeting Date: 09/22/1996 - 09/25/1996

Publication Date: 22-25 Sept. 1996

Location: Mainz Germany On page(s): 785 - 789 vol.2

Volume: 2

Reference Cited: 15

Number of Pages: 3 vol. 1370 Inspec Accession Number: 5637472

#### Abstract:

This paper discusses the feasibility of coding a robust, undetectable, digital w a standard 512\*512 intensity image with an 24 bit RGB format. The waterma capable of carrying such information as authentication or authorisation codes, essential for image interpretation. This capability is envisaged to find applicat tagging, copyright enforcement, counterfeit protection, and controlled access. method chosen is based on linear addition of the watermark to the image datpatterns adopted to carry the watermark are adaptations of m-sequences in c dimensions. The recovery process is based on correlation, just as in standard spectrum receivers. The technique is quite successful for one dimensional enc binary patterns, as shown for a variety of gray scale test images. A discussion extensions of the method to two dimensions, RGB format and non-binary alph presented. A critical review of other watermarking techniques is included

# **Index Terms:**

authorisation binary sequences copyright correlation methods image coding ima analysis message authentication RGB format authentication authorisation codes patterns controlled access copyright enforcement correlation counterfeit protection test images image data image interpretation image tagging image watermarking sequences nonbinary alphabets one dimensional encoding recovery process spre application spread spectrum receivers two dimensional encoding watermarking tech